

Abstract Submitted
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The Influence of Crystal Structure on the Thermal Expansion Behavior of GeZn_2O_4 MICHAEL CRAWFORD, R.L. HARLOW, W.E. GUISE, DuPont Company, R.A. FISHER, Los Alamos National Laboratory, W. WERNER, J.B. PARISE, Stony Brook University, Q. HUANG, J.W. LYNN, NIST Center for Neutron Research, R. STEVENS, California Institute of Technology, B. WOODFIELD, J. BOERIO-GOATES, Brigham Young University, J. LASHLEY, Los Alamos National Laboratory, O. GOURDON, A. HUQ, Spallation Neutron Source, Oak Ridge National Laboratory, J. HORMADALY, Ben Gurion University, P.L. LEE, Y. ZHANG, Argonne National Laboratory — GeZn_2O_4 synthesized at ambient pressure adopts the rhombohedral phenacite crystal structure, whereas cubic or tetragonal inverse spinel phases are formed at high pressures. We have measured the thermal expansion for all three forms of GeZn_2O_4 at temperatures from 10 K to 400 K (or higher) using synchrotron x-ray powder diffraction. The phenacite form exhibits negative thermal expansion below 300 K, changing to positive thermal expansion above that temperature. In contrast to this behavior, the cubic and tetragonal inverse spinel phases exhibit positive thermal expansion below room temperature. Characterization of these materials using x-ray and neutron diffraction, as well as heat capacity and Raman spectroscopy, will be described. Possible structural reasons for the different thermal expansion behaviors of the phenacite and spinel forms of GeZn_2O_4 will be discussed.

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